The extent and content of outdoor advertisements for sugar-sweetened beverages and fast foods in Soweto

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A research report submitted to the School of Public Health, Faculty of Health Sciences, University of Witwatersrand in partial fulfillment of the requirements for the degree of Master of Public Health.

20 October 2014

DECLARATION

I, Shannon Boyd, certify that the following research is my own work, other than what is contained within acknowledgements and references. I am submitting this research paper in completion of the degree of Master of Public Health at the University of the Witwatersrand. It has not been submitted before for any degree or examination at this university or any other. The University of the Witwatersrand Human Research and Ethics Committee approved this study (Clearance Certificate No. M131049).

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20 October 2014

ACKNOWLEDGEMENTS

To my supervisor, Nicola: when the student is ready the teacher shall appear. You have been my lifesaver. Thank you for going far above the call of duty to ensure my success. Your patience and never-ending positive words of encouragement saw me through every step of this challenging journey. Thank you for sharing your knowledge, experience and time with me and for helping me to know that I was right where I was meant to be all along.

To Karen and Gillian, thank you for sharing your data and inviting me to participate in this important work. I believe that it is a promising indication of things to come and it has been encouraging to share my passion and vision with you.

To my South African friends and colleagues at Wits, without whom this goal would not have been feasible, I will forever be indebted to your kindness and generosity. To my friends and colleagues in Canada who always push me in the direction of my dreams, thank you for believing in me.

Thank you to my family who offer unwavering support for the realization of my goals and, without whom, I would not have achieved all that I have.

ABSTRACT

Background: Health experts are calling sugar the new tobacco (Action on Sugar, 2014). The WHO recently revised its recommendations for a maximum daily limit on sugar intake of 25 grams. Yet a 2012 study showed that South African children and adolescents are consuming up to 50 grams and 100 grams per day respectively (Steyn et al., 2003). Sugar is now recognized for its role, not only in promoting caries, obesity and diabetes, but also in the development of cancers. The World Cancer Report 2014, warns of a 'cancer tidal wave' over the next 20 years (IARC, 2014) Health promotion alone is insufficient; drawing on the example of tobacco control, such as advertising restrictions, legislation is the key to prevention. The sugar-sweetened beverage (SSB) industry is the leader among all sectors in marketing to young people (Arredondo et al., 2009), thus a similar approach is recommended for restricting SSB advertising to reduce chronic disease risk. There is no data regarding SSB advertising and obesogenic environments in South Africa. This pilot study is the first to describe the location, content and characteristics of outdoor print advertisements for SSBs and fast foods in South Africa.

Methodology: This is a secondary analysis of data collected as part of a larger 2013 study investigating the obesogenic environment in Soweto, South Africa. All visible outdoor advertising and branding of SSBs and fast food in a five-square kilometer demarcated area were included. Data on content, quantity, location, size and type of advertisements was collected in the field and a photograph was taken for further analysis. Comparisons were drawn to photographs of alcohol advertising in the same area. Data was captured using a coding sheet and was analysed descriptively and using inferential statistics. The advertisements included billboards, banners, posters, pole advertisements, painted signs, branded school signs, branded shop signs, directional signs and branded umbrellas and fridges. A total of 237 photographs were included in the study.

Results: The main findings of this study indicate a significant presence of advertising and branding for sugar-sweetened beverages in Soweto. SSB and fast food advertising and branding accounted for 62.86% of all advertising in the area under study. Of all SSB and fast food brands available in South Africa, Coca-Cola accounted for 86.58% of this advertising and branding. Unlike alcohol advertising, which is restricted to the locations in which alcohol is sold, advertising for SSBs is pervasive throughout the community, seen everywhere from shops and schools to transit stops and on street sides. Most SSB advertising and branding signage is medium or large in size. Images of people were only present in a small number of the adverts. However when people were present, they were consistently young people under the age of 35. The race of people in the adverts consistently represented the black African demographic of Soweto. While the main goal of the adverts appears to be product and brand recognition, there is a trend across the SSB adverts to convey messages of happiness, positivity, friendship, fun and well-being, suggesting that consumption of these products would lend to such outcomes for the consumer. A small percentage also promoted special deals to encourage product purchase.

Conclusion: SSB advertising in Soweto is extensive, far surpassing advertising for junk food or alcohol. The government should consider implementing legislation, to restrict SSB advertising. The country should also urgently move to adopt WHO's new guidelines on the daily upper limit for sugar intake (Mann, 2012), and to limit SSB intake specifically, which should be reflected in revisions to South Africa's food-based dietary guidelines. Further research should focus on the association between the high rate of exposure to SSB advertising in Soweto and the level of consumption of SSBs and on the understanding of the advertising environment and how this affects the health literacy of South African children and adolescents.

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Age of acquisition: the age at which a learning occurs and its subsequent significant affect on outcome. This is most commonly reflected in language, the arts and athletics (Hernandez and Li, 2007).

Epidemiological Transition: the shift from a high prevalence of infectious disease associated with malnutrition, periodic famine and poor sanitation, to the high prevalence of chronic disease associated with urbanisation and industrial lifestyles (Popkin, 2006, Popkin, 1993).

Nutrition Transition: the large shifts in dietary and physical activity patterns (Abrahams et al., 2011); with a change from traditional foods (mostly plant-based, low in fat and high in fibre) to a substantial increase in the consumption of fat, sugar and refined foods (Popkin, 2006).

1. CHAPTER ONE: INTRODUCTION

A decade ago, the World Health Organization presented statistics revealing the impact of chronic diseases of lifestyle, the threat of which has been growing rapidly and yet remained largely underestimated. Over half of all deaths worldwide in 2005 were attributed to chronic diseases such as heart disease, diabetes and cancers, totaling 35 million people (World Health Organization, 2005). Without sufficient intervention, that number has continued to increase, rising to 38 million deaths annually by 2014 (WHO, 2014b). As many as 85% of these deaths are estimated to have occurred in the developing world (WHO, 2014b), an increase of 5% from 2005 (World Health Organization, 2005).

There are twice as many deaths caused by chronic diseases as there are by infectious diseases, maternal and perinatal conditions and nutritional deficiencies all combined (World Health Organization, 2005). Despite this, infectious disease resources for HIV, TB and malaria, continue to remain the priority in low- and middle-income countries, including South Africa (The Global Fund to Fight AIDS Tuberculosis and Malaria, 2014). There has been a very slow response to preventing chronic diseases and effectively addressing modifiable risk factors such as nutrition, in both developed and developing countries (World Health Organization, 2005).

In February 2014, The International Agency for Research on Cancers (IARC), a division of the World Health Organization, released the World Cancer Report 2014. This report suggests that there will be a 75% global rise in cancer over the next 20 years, projecting a cancer incidence rate of 25 million, up from 14.1 million in 2012 (IARC, 2014). It acknowledges that prevention, while previously neglected, is critical and will be achieved by tackling risk factors of obesity, smoking and alcohol intake (IARC, 2014).

South Africa is not immune to the growing burden of chronic disease. The country is experiencing an epidemiological transition from communicable diseases to non-communicable metabolic diseases (Mayosi et al., 2009, Bourne et al., 2002) and, as a result, faces a challenging quadruple burden of disease that includes maternal and infant mortality and injuries as well. This environment of chronic disease includes an increasing prevalence of chronic over-nutrition, lending to overweight/obesity, which is a rapidly growing public health concern in South Africa (Mchiza and Maunder, 2013).

Abrahams et al (2011) examined 40 Sub-Saharan African (SSA) countries to identify each country's stage within the nutrition transition. A low score of zero or one indicated a very early state of nutrition transition wherein primordial prevention was possible. Conversely, the highest possible score of six indicated the last phase of the nutrition transition. Countries with high scores exhibited clearly changing health outcomes (i.e. nutrition-related NCDs) among a large portion of the population, due to changing diets (Abrahams et al., 2011). Of the 40 SSA countries under study, South Africa was the only country to receive a score of six and to be well established in the last phase of the nutrition transition (Abrahams et al., 2011).

The nutrition transition has meant that South African diets have shifted away from traditional plant-based foods that are low in fat, high in fiber and high in essential nutrients, toward a diet that is high in energy, sugar, refined carbohydrates and saturated fats and low in fiber and essential nutrients (Bourne et al., 2002, Kimani-Murage, 2013). This diet is referred to as the Standard American Diet (SAD) (Joung et al., 2012).

Health experts have identified the combined elements of the SAD diet as an underestimated cause contributing to the increase in chronic diseases (Cordain et al., 2005, Bourne et al., 2002). Sugar in particular is now being recognized for its role in obesity, heart disease, cancers and metabolic syndrome in addition to its role in the

etiology of dental disease and diabetes (Johnson et al., 2009, Nguyen et al., 2009, Lim et al., 2010, IARC, 2014, Lustig et al., 2012). Health experts are calling sugar the new tobacco (Action on Sugar, 2014). Unlike all other macro- and micronutrients, sugar is not an essential nutrient. It has no nutritional value (Canadian Sugar Institute, 2014) and can cause micronutrient dilution, the depletion of other essential nutrients, such as iron, zinc and B vitamins, needed for the maintenance of good health (Steyn et al., 2003, Cordain et al., 2005). For these reasons, there is no recommended daily intake (also called dietary reference intake) for sugar as there is for all other vitamins, minerals and macronutrients, but rather only the question of what research can demonstrate should be the maximum daily limit or tolerable upper intake limit (Health Canada, 2010).

Considering the established link between sugar consumption and obesity rates, (Woodward-Lopez et al., 2011), the need to address dietary intake – specifically the amount of sugar and sugar-sweetened beverages (SSBs) in diets – must receive greater attention. Public health professionals and governments now need to prioritize nutrition and chronic diseases equally with infectious diseases (Stuckler and Nestle, 2012) and invest in prevention as much as treatment (Gallagher, 2014).

Urbanization and globalization, along with the global expansion and market saturation of a small number of large companies in the food industry (Stuckler and Nestle, 2012), are two of the major factors contributing to this transition to a SAD diet in developing countries. Fast food and SSB companies are leading the way in this respect. For example, Coca-Cola Company continues to expand its SSB market share with its volume sales growing by 20 percent in India, nine percent in China and 10 percent in South Africa in 2012 alone (Forbes, 2012). Coca-Cola's global growth continues thanks to increasing investments and market saturation in developing countries, which is partially achieved with investments in marketing (Forbes, 2012).

Understanding the prevalence of Coca-Cola advertising and branding, for example, may partially help to understand the high rate of consumption of SSBs in South Africa. South Africa is Coca-Cola's largest market in all of Africa and is consistently one of the top ten markets in the world (The Coca-Cola Company, 2009). Globally, Coca-Cola's per capita beverage consumption in 2011 was 92 servings per person per year, based on an 8 fluid ounce serving. In South Africa, this number rose to 247 servings per person (The Coca-Cola Company, 2012).

Examining the advertising and marketing environment that may be promoting this level of SSB consumption could provide insight into its potential contribution to the chronic disease burden among South Africans. Previous research has indeed demonstrated that SSB consumption is directly affected by exposure to SSB marketing and advertising (Koordeman et al., 2010), with children and adolescents being particularly vulnerable. As stated by Fister "Junk food and the advertising that promotes it are a serious threat to the health of [children and adolescents]" (Fister, 2005).

It is during childhood and adolescence that foundations for healthy or unhealthy eating are typically established (Joung et al., 2012, Fister, 2005). Therefore it is important to examine the determinants, such as advertising and branding, which are contributing to the creation of disease promoting diets that are adopted early in life and continue throughout adulthood. This will inform the development of public health interventions that can begin to reverse the trend towards a high prevalence of chronic diseases.

1.1 Statement of Problem

The World Health Organization estimated that 338 million people would die of a chronic disease between 2005 and 2015, with 2.6 million dying annually as a result of overweight/obesity alone (World Health Organization, 2005). South Africa's prevalence of overweight/obesity is 54.9%, contributing to a non-communicable disease (NCD) mortality rate of 867 per 100,000 (Abrahams et al., 2011).

In a 2014 report profiling the picture of NCDs in 194 countries, South Africa ranked 15th in terms of NCD risk, specifically the probability of dying between the ages of 30 and 70 from one of the four main NCDs (cardiovascular disease, cancer, chronic respiratory diseases and diabetes) (WHO, 2014b). South Africa, an upper-middle income group country, exhibits a 27% risk. The majority of the countries that ranked higher were low and lower-middle income group countries, several being Middle Eastern countries (WHO, 2014b). For comparison purposes, the probability of NCD related death is 21% in Botswana, 19% in Brazil, 14% in the U.S.A and 12% in the U.K. (WHO, 2014b).

A recent population health survey contributes more specific data regarding NCD prevalence in South Africa. The SANHANES-1 found that one in four men and one in two women are unfit, with the prevalence of overweight and obesity among men at 19.6% and 11.6% respectively, and 25% and 40.1% among women (Shisana et al., 2013). Of participants who completed a clinical examination, one in five had impaired glucose homeostasis, with almost 10% being diagnosed with diabetes, and two-thirds of those who were overweight/obese were also found to have high blood pressure (Shisana et al., 2013).

Warning signs of the emerging epidemic are clearly visible among children, with 11.5% of boys and 16.5% of girls being overweight, while 4.7% of boys and 7.1% of girls are obese (Shisana et al., 2013). The combined overweight/obesity for children ages 6-14 in

South Africa is 13.5%, above the 10% global prevalence rate among school children (Mchiza and Maunder, 2013). Considering that BMI increases with age in both sexes (Shisana et al., 2013), urgent attention is needed to manage the future health of South Africa's children.

Research has demonstrated that the Standard American Diet, which is high in saturated fat, sugar and energy and low in fiber and essential nutrients is associated with obesity, chronic disease and metabolic syndrome (Joung et al., 2012). Awareness of the role of sugar specifically in the etiology of obesity and other chronic diseases is being developed. The concerns regarding sugar include but are not limited to glucose, fructose and sucrose that are naturally-occurring in foods or that have been added to foods by the manufacturer (World Health Organization, 2014b), such as is the case with sugar-sweetened beverages.

The prevalence of obesity, diabetes and glucose intolerance, hypertension, hypercholesterolemia and dyslipidemia are markedly increasing worldwide, largely due to the imbalanced SAD diet (Joung et al., 2012). It has been suggested that South Africa's nutrition transition to this disease promoting diet has occurred more rapidly than that of other countries (particularly resource-rich countries) due to a more rapid economic transition, rapid urbanisation and globalization (Popkin, 2002).

Unfortunately children and adolescents are not immune to this trend. On the contrary, they are growing up in the middle of this nutrition transition and are quickly demonstrating the health consequences of a nutrient-poor diet. In South Africa, the rate of overweight and obesity among both male and female adolescents increased markedly between 2002 and 2008 (Reddy et al., 2012). This same study noted that overweight and obesity were notably higher among urban versus rural adolescents.

Overweight and obesity also have economic consequences, which will be particularly devastating to the low- and middle-income countries most affected (World Health Organization, 2005). For example, the 2005 WHO report on chronic diseases suggested that in the decade ending in 2015, China will have lost as much as $558 billion in potential national income as a result of premature deaths caused by chronic diseases (World Health Organization, 2005). Obesity and other chronic diseases are perpetuating the vicious cycle between the determinants of poverty and poor health. Understanding that it is possible to prevent up to 80% of heart disease, stroke and diabetes (World Health Organization, 2014a) and as much as half of all cancers (IARC, 2014), this is an unacceptable epidemic and an unnecessary burden for developing economies.

There is a growing body of evidence that suggests that advertising, marketing and communications and branding are contributing to the increased consumption of the unhealthy foods that are contributing to rising chronic disease rates. In particular, more frequent television viewing, and thus greater exposure to food advertisements on television, is associated with increased intake of SSBs and fast foods and lower intake of fruits and vegetables (Steyn et al., 2014).

There is currently a lack of research in South Africa on food advertising on television. However one study found that children ages 7-14 were exposed to 24 minutes of advertising per day (Cassim, 2010), while another study found that 55% of advertisements aired on television during children's programming were for fast foods and other foods of poor nutritional value (Temple and Steyn, 2008).

1.2 Justification for Study

An increase in food marketing of high fat, energy-dense foods, has been linked to the increase in global childhood obesity (Forman et al., 2009). In modern society, children and growing up "in a highly sophisticated marketing environment that influences their preferences and behaviours" (Calvert, 2008). This "toxic environment" (Keller et al., 2012a) is pervasive throughout children's homes, schools and communities and is highly influenced by the food industry and government policies (Story et al., 2008).

Over the past few decades there has been a significant increase in the presence and availability of fast foods and fast food outlets, particularly in low-income, urban environments (Story et al., 2008). These fast foods are typically high in calories and low in nutritional value and, as such, are acknowledged to be contributing to chronic disease. Developing countries such as South Africa, are going to bear the brunt of the health and economic consequences (World Health Organization, 2014a).

In the wake of rapidly increasing rates of obesity globally, and considering the prevalence of HIV and TB in South Africa, the myriad of communicable and non-communicable diseases that are further fueled by the physiological domino effect of sugar intake cannot be ignored (Cordain et al., 2005, Steyn and Temple, 2012). Importantly, the WHO is now taking a closer look at the health consequences of sugar intake and its role in obesity and chronic disease. In March 2014 the WHO launched a public consultation in its efforts to draft new guidelines and recommendations regarding the consumption of free sugars and SSBs in particular (World Health Organization, 2014b). The extent to which high sugar, high fat and refined foods are being advertised, branded and marketed to a vulnerable audience in South Africa must be explored and given due consideration for population health and policy implications.

The IARC argues that health promotion alone is insufficient in curbing the looming global cancer crisis, but rather that legislation is the key to prevention. The report draws on the example of tobacco control legislation in reducing tobacco consumption, such as advertising restrictions and taxes, and recommends that similar approaches be applied to the consumption of sugar-sweetened beverages in reducing cancer-related risk behaviours and exposures (IARC, 3 February 2014, IARC, 2014). It is the role of governments to implement such legislation in an effort to protect population health. Research such as this can help to identify the pervasiveness of advertising for SSBs in South Africa and inform related legislation. After searching multiple electronic databases, no data regarding advertising and obesogenic environments in South Africa has been found. Furthermore, existing research on junk food advertising and advertising directed at children predominantly focuses on television advertising in developed countries (Hastings et al., 2006), whereas this study explores outdoor print advertising in a middle income setting.

Existing studies have already demonstrated the relevance and impact on behaviours and health of fast food and SSB marketing and brand logo recognition (Keller et al., 2012b, Fister, 2005, Bruce et al., 2013). The next step then is to understand the *extent* of fast food and SSB advertising in South Africa. This study will involve a comprehensive descriptive analysis of the location and content (messaging, images, etc.) of outdoor advertisements for sugar-sweetened beverages (SSBs) and fast foods in order to better understand the influence they may have on consumption and the potential impact this has on the future health outcomes and chronic disease burden among South Africans.

It is important to examine the location and density of advertising and branding of SSB and fast foods in South Africa in order to understand the pervasiveness of the adverts and brands in the specified areas. This is of particular concern with respect to the environments where children and adolescents live, work and play, to understand to what extent their food choices and dietary behaviours – and long-term health - may be

impacted as a result. For example, do the advertisements and branding appear at or near schools or parks/playgrounds, on the streets where they live, or on the streets where they walk to school? Additionally, it is important to explore what the images and messages of these adverts and brands are saying to children, which may further affect their adoption of either health-promoting or disease-promoting behaviours.

With rising obesity epidemics globally, there has been significant debate regarding the banning of junk food advertising to children (Hawkes, 2007, Hastings et al., 2006). This study may help contribute to this dialogue in South Africa by identifying how and where children are being exposed to advertising and branding. Additionally, it may be used in future studies to determine links between the location of adverts/branding and the prevalence of obesity in those areas. The results of this study may also help inform a policy brief in South Africa related to the advertisement of SSBs as well as recommended limits on SSBs in keeping with the WHO's pending new guidelines, and thus may be relevant to stakeholders in government, corporate and non-government organization.

1.3 Study Aim and Objectives

Aim:

To describe the characteristics and content of outdoor print advertisements for sugar-sweetened beverages and fast foods in Soweto in July-August 2013, and to explore the targeting of children and adolescents.

Objectives:

1. To describe the characteristics such as geographic location, size and type of outdoor advertisements, for SSBs and fast food in Soweto in a five kilometer radius surrounding Chris Hani Baragwanath Hospital in July and August 2013.
2. To describe and compare the content of the outdoor advertisements for SSBs and fast food in Soweto in a five kilometer radius surrounding Chris Hani Baragwanath Hospital in 2013
3. To explore which advertisements for fast foods and SSBs in a five-kilometer radius surrounding Chris Hani Baragwanath Hospital in July and August 2013 target children and adolescents.

2. CHAPTER TWO: LITERATURE REVIEW

2.1 Branding and Children

Among all sectors, the fast food industry is leading the way in marketing to young people (Arredondo et al., 2009). Over the past several years, with the pervasive nature of advertising to children, there has been much speculation regarding children's physiological and neurological response to advertising. A recent study by Bruce et al. examined the effect of seeing branding on children's brains using magnetic resonance imaging (MRI). They found that, when compared to baseline, viewing food logos elicited increased activity in the orbitofrontal cortex and inferior prefrontal cortex areas of the children's brains (Bruce et al., 2012). Additionally, they found that when compared to logos for non-food items, food logos had a greater effect on increasing activation in the posterior cingulate cortex. These regions in the brain are associated with motivation. Thus the study concluded that viewing food logos activates areas in children's brain associated with motivation (Bruce et al., 2012).

A further study looked specifically at the response to food branding in obese children versus healthy weight children. This study found that, when viewing food logos, obese children demonstrated *less* activity in the area of the brain associated with cognitive control than healthy weight children (Bruce et al., 2013). This means that obese children demonstrated less restraint when exposed to food logos and when allowed unrestricted food consumption. This conclusion raises concerns of the potentially dangerous cyclical effect of food advertising and consumption; the more fast food and SSBs that are consumed the greater the risk of overweight and obesity in children, while overweight/obesity lends to greater vulnerability to food advertising and branding.

In the public health sector, the promotion of healthy lifestyles and the establishment of healthy behaviours are widely accepted to be critical in childhood so that the foundation for adult health is established early (Kuh and Cooper, 1992, World Health Organization, 2003). A 2010 study demonstrated that the same holds true when extended to the branding environment. This study drew three conclusions: brands learned earlier in life are recognized more quickly than brands learned later in life, older participants recognized "early learned" brands from their past that no longer existed faster than they recognized current brands, and the effect of age of acquisition extends to brand recognition (Ellis et al., 2010). This finding becomes particularly relevant considering that brand recognition has been shown to influence product preference and choice (Thoma and Williams, 2013). This was proven to hold true even if the recognized brand had negative information associated with it while the unrecognized comparison brand did not (Thoma and Williams, 2013).

Children have been uniquely and intentionally targeted by fast food marketing and advertising and, as a result, have extensive recall of this advertising (Hastings et al., 2006). This recall has been proven strongest for sugar-sweetened beverages (Hastings et al., 2006).

Together these studies conclude that marketing and branding for fast food and sugar-sweetened beverages may influence product preference and consumer choice, and become more influential throughout adulthood the earlier in life that brand recognition is established (Ellis et al., 2010, Thoma and Williams, 2013). Knowing the effect that food and brand logo recognition can have on an individual's choices and behaviour makes understanding the extent of SSB advertising in South Africa of even greater importance.

There is little research on food advertising on television in South Africa; however, a recent study did explore this issue by evaluating the extent of television advertising of food products to children (Mchiza et al., 2013). The results of the study revealed that over the course of seven consecutive days, between the hours of 15:00 to 21:00, a total of 665 advertisements aired across four major local broadcasting stations, with 84.2% of those adverts being for food and beverages. The majority of these food adverts were for unhealthy foods high in fat, salt and/or sugar, and which contained messages claiming improved well-being and performance (Mchiza et al., 2013).

While many developed countries have already adopted legislation placing various levels of restrictions on television advertisements of unhealthy foods to children, no regulations currently exist in South Africa (Steyn et al., 2014). The Consumer Goods Council of South Africa (CGCSA), which represents 150 food, beverage and grocery companies, created The South African Marketing To Children Pledge, which was adopted by the Advertising Standards Authority (ASA) (CGCSA, 2008). However this document serves as a guideline only and is not a mandatory commitment. Moreover, it solely addresses television advertising to children under twelve, as well as advertisements and marketing/communications in close proximity to pre- and primary schools, while excluding all other forms of advertising, marketing and branding (CGCSA, 2008). In 2007, the Department of Health created a draft policy document titled "Foodstuffs, Cosmetics and Disinfectants Act", to restrict advertising, however its was put on hold due to industry debate and has yet to be revisited (Steyn et al., 2014).

2.2 Fast Food and Sugar Consumption and Overweight/Obesity

Three-fourths of world food sales involve processed foods and the majority of growth in the sale of these foods by multinational food and beverage companies occurs in developing countries (Stuckler and Nestle, 2012). This is what is behind the global rise in consumption of SSBs and foods high in fat, sodium and added sugars. In South Africa, the processed and fast foods most commonly consumed include burgers, pizza, fried chicken and soft drinks, which are not only high in fat, sodium and added sugars but are also low in fibre and micronutrients (Van Zyl et al., 2010). It is widely acknowledged that intake of such energy-dense, micronutrient-poor foods contributes to weight gain and obesity, while adequate fibre intake would provide protection against overweight/obesity (Van Zyl et al., 2010).

When considering sugar intake, it is important to acknowledge the many different types of sugar, which include sucrose (typically white and brown table sugar), fructose (fruit sugar), lactose (milk sugar) and maltose (sugar in grains and refined carbohydrates) (American Heart Association, 2014). Sucrose is the refined sugar often added to fast foods and SSBs, while the latter three are naturally occurring sugars in foods. Other sugars commonly added to foods include high-fructose corn syrup, malt sugar, honey, molasses and cane sugar (American Heart Association, 2014). All sugars contain four calories per gram.

While many countries have food-based dietary guidelines for the intake of macro and micronutrients (Food and Agriculture Organization of the United Nations, 2009), there is no recommended daily intake for sugar as part of a healthy diet. Rather it is simply suggested to limit sugar consumption. The American Heart Association (AHA) recommends that adult men consume a maximum of 150 calories from added sugar daily (approximately 37 grams or 9 teaspoons) and that adult women limit daily intake to 100 calories (approximately 25 grams or 6 teaspoons) (Steyn et al., 2003). The AHA

further suggests that the ideal number of servings of sweets and added sugars *per week* in a 1600 calorie diet actually be zero and in a 2200 calorie diet be no more than five (American Heart Association, 2012).

The WHO's recommendation from 2002 is that total sugars from all sources should constitute a maximum of 10% of total calories, or daily energy intake. The revisions currently being made for the WHO's proposed new guidelines suggest that a reduction to less than 5% of total daily energy intake, the equivalent of 25 grams or 6 teaspoons, would be beneficial (World Health Organization, 2014c). This is consistent with the AHA's current recommendations. It is of interest to note that a single serving can of regular Coca-Cola contains the equivalent of 10.5 teaspoons of added sugar. While Vitamin Water, a fruit juice that is marketed as a "nutrient enhanced water beverage" (Glaceau vitaminwater, 2012), contains 8 teaspoons of sugar in a single 20-ounce bottle. The WHO's new recommendations would then suggest that, for optimal health and the prevention of disease, an individual bottle of Vitamin Water or individual size can of coke would exceed an individual's total sugar intake from all sources for an entire day. A 2012 South African study reviewed existing research on sugar intake among South Africans and its associations with obesity, chronic diseases and dental caries. The research indicated that sugar consumption is on the rise, with children consuming approximately 50 grams per day and adolescents consuming up to 100 grams daily (Steyn et al., 2003). This is up to 4 times the amount recommended for adults by the AHA.

Sugar, and in particular, sugar-sweetened beverages, have been suggested to be contributing to the rising prevalence of obesity and childhood obesity in particular. While the epidemic is multifactorial, several studies have been conducted to demonstrate this link. One such study found that the likelihood of obesity increased 1.6 times among children for each additional serving of SSB they consumed each day (Ludwig et al., 2001). On the other hand, an intervention that aimed to reduce

consumption of SSB among an intervention group of adolescents over 25 weeks demonstrated a beneficial effect on reducing BMI (Ebbeling et al., 2006). It has however been suggested that higher quality randomized trials are needed to demonstrate such a link (Pereira, 2006).

Another study on pre-adolescent children concluded that children's intake of SSBs was associated with significantly lower levels of 25-hydroxy vitamin D (25OHD) and bone mineral density (BMD) (Nassar et al., 2014). Their results further demonstrated that the duration of intake of SSBs was a determining factor for the association with decreased 25OHD and BMD (Nassar et al., 2014). This study reinforces the need to establish healthy dietary habits early in life and to prevent the early consumption of SSBs in childhood so that this intake does not continue consistently throughout life thereby increasing the risk for chronic disease over the life cycle.

The same holds true in studies with adult subjects. A recent literature review noted that obesity rates in the United States increased alongside increasing consumption of sugar-sweetened beverages and that studies consistently showed a that a higher intake of SSBs is related to both a higher total energy intake and higher adiposity (Woodward-Lopez et al., 2011). Their review also found that a reduction in total dietary energy from all sources could not compensate for the additional energy intake from liquid/SSB calories (Woodward-Lopez et al., 2011).

Links between maternal consumption of SSBs and health outcomes among both adults and children have been found. A study conducted in Norway looked at the relation between maternal consumption of SSBs and infant birth weight. It concluded that the national increase in birth weight and large babies seen in Norway between 1989 and 2009/10 was directly related to a national trend in increased consumption of SSBs, independent of other possible effects (Grundt et al., 2012). This could mean that a

reduction of SSB consumption among women of childbearing age could have a direct affect on the health of children.

2.3 Tobacco as a Case Study

After scientific studies demonstrated the link between smoking and cancer risk in the 1950s, the tobacco industry faced similar pressure then as the junk food industry faces now regarding advertising of their unhealthy products. One approach the tobacco industry took to mitigate this response was an investment in corporate social responsibility (CSR) initiatives (Dorfman et al., 2012). CSR is a corporation's voluntary commitment to operate its business in a socially, environmentally and economically sustainable manner (Foreign Affairs Trade and Development Canada, 2014). For example, in response to the increasing prevalence of smoking by young people, major tobacco companies implemented smoking prevention campaigns for youth. Critics however, suggested that these tactics were backhanded in an effort to avoid increased regulations imposed by government and to actually encourage smoking among young people by employing reverse psychology, in order to avoid a threat to their bottom line (Dorfman et al., 2012).

Eventually the tobacco industry's lobbying efforts succumbed to the greater public health interests and tobacco control initiatives were introduced. Studies indicate that when smoking prevalence declines there is a concomitant reduction in lung cancer. With an estimated 965,446 new lung cancer cases per year among males and 386,875 cases per year among females, lung cancer is the most common cancer in the world and the leading cause of cancer-related mortality. Yet during the years 1973 to 1997, following the implementation of tobacco control initiatives, lung cancer incidence rates either decreased or were stable among males in the areas under study (Kamangar et al., 2006).

The tobacco industry now faces some of the strictest advertising regulations, with advertising bans in place in many countries around the world (The Conference of the Parties to the WHO FCTC, 2003). In 2005, The World Health Organization developed the Framework Convention on Tobacco Control, which outlined both requirements and recommendations to manage and reverse smoking and lung cancer rates (Kamangar et al., 2006). The requirements include restrictions on advertising, sponsorship and promotion of tobacco and specifications for packaging and labeling (e.g. health warnings on cigarette packages). The recommendations include policies to ensure clean indoor air and tobacco smuggling legislation (Kamangar et al., 2006).

Despite the public health progress that has been made regarding tobacco control, there continues to be a high prevalence of exposure to advertisements promoting smoking to adolescents in low and middle income countries (Agaku et al., 2013). One study found that exposure to tobacco advertising led 5% of individuals who had never smoked at baseline to subsequently smoke more than 100 cigarettes over the 30-month observation period (Morgenstern et al., 2013). This same study claimed that for every 10 tobacco advertisements viewed by individuals who had never smoked previously, the relative risk for becoming an "established" smoker (i.e. smoking more than 100 cigarettes over the course of the observational period) increased by 38% and the relative risk for becoming a daily smoker increased by 30% (Morgenstern et al., 2013). Another recent study found that the greater the exposure to cigarette advertisements, the greater the risk of smoking initiation. Smoking initiation rates were 10% among a group of adolescents with low exposure to cigarette advertisements, 12% among those with medium exposure and 19% among those with high exposure (Hanewinkel et al., 2011).

Extensive research continues to argue that the majority of the global burden of lung cancer could be prevented by implementing tobacco control interventions such as restrictions on advertising of tobacco products, anti-tobacco advertising, raising the

price of cigarettes and tobacco products, banning smoking in public places and treating tobacco dependence (Centers for Disease Control and Prevention, 2007).

2.4 Lessons Learned from the Advertising Ban in Quebec

In 1980 the Quebec Consumer Protection Act banned all advertising, including both print and electronic media, directed at children under the age of 13 years. This law applied to provincial media only and not to media originating from the neighbouring province of Ontario or the United States. A 1990 study showed the ban successfully reduced exposure to unhealthy foods and also reduced pressure from children on parents to purchase the foods (Goldberg, 1990). A subsequent study from 2011 went on to further explore the ban's effect on consumption, using household level field data. This research suggested that households in Quebec were "significantly less likely" to purchase fast food compared to their counterparts in Ontario where there is no advertising ban (Dhar and Baylis, 2011). Fast food expenditures in the province dropped by 13% per week (estimated to be USD88 million per year) and Quebec snack consumption rates are the lowest in all of Canada, while fruit and vegetable consumption is the highest (Dhar and Baylis, 2011). The 2004 Canadian Community Health Survey supported these findings, indicating that the level of overweight and obesity among 2-17 year olds in Quebec was significantly below the national level (Statistics Canada, 2005). The authors of the 2011 study suggested that their estimates of the overall effect of the ban on consumption were underestimated when considering the additional affect on adults.

3. CHAPTER THREE: METHODOLOGY

3.1 Study Design

This study is a secondary analysis of data collected as part of a larger study investigating the obesogenic environment in Soweto. The primary study used a cross-sectional study design to investigate the nutritional value and cost of fast food and sugar-sweetened beverages sold by vendors. The primary study also collected data on the density of both vendors and outdoor advertising for fast foods, sugar-sweetened beverages and alcohol, and the proximity of the vendors advertisements to schools (Moodley et al., 2014).

This secondary analysis utilized data collected in July and August 2013 to describe the location and content of advertisements for sugar-sweetened beverages and fast foods in Soweto.

3.2 Study Setting

The primary study was conducted in Soweto, an urban suburb located Southwest of the city of Johannesburg that was established as a result of the discriminatory race policies of the Apartheid government (Mears, 2011). Today, Soweto still maintains a predominantly black African population of approximately 1.3 million people. About a third (35%) of the population completed Grade 12 or higher education in 2008, while the percentage of individuals with no education was 13%. The unemployment rate was 19.8% in 2008 (Mears, 2011). A five-square kilometer area in the centre of Soweto was identified for data collection using Google Maps, with a focus area on the townships of Klipspruit and Orlando West.

3.3 Study Population and Sampling

The population included all outdoor advertisements for, and branding of, SSBs and fast foods throughout Soweto that are visible from the streets. Branding is defined as the creation of a unique name and image for a product, with the aim of establishing a unique presence in the market and attracting and retaining customers (WebFinance, 2014). Fast foods have been defined in a previous South African study as "cooked or ready prepared foods bought at a take-away restaurant" (Van Zyl et al., 2010).

All visible outdoor advertising and branding of SSBs and fast food in a 38 square kilometer area of Soweto, with a focus area on the townships of Klipspruit and Orlando West, were included in the study. All alcohol advertisements in the same area were included in the study as a comparison group. Data on location, size and type of advertisement was collected in the field and a photograph was taken for further analysis. The advertisements included billboards, banners, posters, pole advertisements, painted signs, branded school signs, branded shop signs, directional signs and branded umbrellas and fridges on wheels. Excluded from the study were clothing items, packaging, taxis and buses, actual fast food stores and unbranded signs. The data coding sheet and codebook are included in Appendix A.

The secondary data analysis included coding of all photographs taken of the outdoor advertisements for sugar-sweetened beverages and fast foods in the designated area. The total number of adverts included was 237.

3.4 Data Collection

Three trained researchers collected the data over an eight-day period. Using the Developmental Pathways for Health Research Unit (DPHRU) vehicle and commencing from Chris Hani Baragwanath Hospital, the research assistants systematically covered the area under study, driving and walking through the streets to identify and capture

outdoor advertisements. The total number of kilometers covered was tracked each day, which, over the eight-day data collection period, was 112km with the total area covered being 38.3km^2 (Moodley et al., 2014).

The researchers used a digital camera to take photographs of advertisements. Descriptions of advertisements were then recorded on a coding sheet (See Appendix A). Photographs of the adverts were uploaded onto a computer at the end of fieldwork for the day, matched with the descriptions, type, size and location of the advertisement that were recorded on the coding sheet in the order of capture and re-named according to the unique ID that corresponded to the description. These data were stored in an Excel database.

The three researchers were trained to identify appropriate advertisements and branding to be included in the study, to use the coding sheet and to take digital photographs. Following the completion of data collection, a content analysis of the photographs was completed by the researcher, using a coding sheet (See Appendix B). A sample of the photographs was coded by a second coder to determine inter-coder agreement and to revise definitions or coding, if required.

3.4.1 Pre-testing the Data Collection Procedure and Tool

The primary study included a pre-testing phase as an opportunity to determine the fieldwork procedures for the study. In addition, it gave the researchers an opportunity to test the data collection tool and adjustments were made accordingly prior to beginning the study. These included determining the type of adverts that would be included in the study and revising the codebook for type of advertisement (e.g. codes for school signs, posters, banners, etc.), adding an open-ended item to capture the 'description' of the advert, and typing the first few digits of the GPS coordinates that remained static into the tool to save time during data collection. Additionally, the exact study site (5km square) in Soweto was finalized when the team conducted this pre-test.

3.5 Measurement

A data coding sheet (Appendix A) was used in the primary study to collect data in the field. This tool included the following: the type of advert or branding, the format of advert, size, location and a description of the advert or branding.

A second coding sheet was developed by the researcher to code the content of the advertisements that was captured in the photographs taken of the advertisements and branding (Appendix B). This included the following additional dimensions: the brand portrayed in the advert, presence of images and image type, the sex, age and race categories of people appearing in the advertisements, and specific messages conveyed by the advertisements.

The type of advertisement or branding referred to whether it was for an SSB product, a fast food product, both SSB and fast food, or alcohol as the comparison group.

Format of adverts included school signs with branding/advertising, shop signs, branded umbrellas, painted signs, posters and banners. Shop signs are branded signs denoting a small privately owned tuck shop or shebeen. A poster was defined as a printed sign, typically on some form of cardboard or metal, containing pictures, text or both, and adhered to a wall or vertical surface, such as the side of a building. Banners were defined as a piece of cloth or cloth-like material that was hung on a wall or fence, while billboards were defined as very large self-standing printed advertisements often next to a main road or on a building.

Most of the advertisements and branding were out of reach and thus exact measurements were not used to determine size. However a small advert was defined as one between size A4 and A3, a medium advert was approximately A0, and a large advert was estimated to be a couple of meters in height and/or width. Large billboards were several meters in height and width.

The location of the adverts and branding were defined as physical location, for example at a taxi stand, at a bus stop, on the street/side of the road, near a school, etc., rather than geographical location.

The brand captured referred to the brand of the product specifically, (e.g. Coca-Cola, Fanta or Sprite), not the company owner of that brand (e.g. Coca-Cola).

For the purposes of this study an image was defined as a picture that contained either people, products (an SSB or fast food product or both), and/or graphics appearing in the advert. It does not include adverts containing words only. In this case, an advert was coded as not containing an image.

The variable target age was defined as the advert containing a picture of a person who fell into one of three age categories: children and adolescents 18 years and under, youth ages 19 to 35 and adults 36 years and older. Target sex and race referred to those characteristics of the people appearing in the advertisements.

The messages conveyed by the advertisements were coded into four broad categories: positive relationships, state of being, emotional health and physical health. Messages were subsequently further coded within each category. The category for positive relationships included adverts containing pictures or words conveying families or friendships, while state of being included variables for fun, success and social status, emotional health included variables for happiness and fulfillment, and physical health included variables for physical activity and physical fitness. Advertisements determined to be conveying multiple messages were coded accordingly.

3.6 Data Processing Methods and Data Analysis

All data was entered into the database from the data coding sheets. Data and coding were quality checked, cleaned and errors corrected. The data was exported into excel and STATA 13 for analysis. The field workers captured certain data, such as format of advert, in the field, while other data was captured by the researcher based on the photographs. Thus a component of data cleaning involved a comprehensive review of the data that was captured in the field and comparing the data to the photographs. Recoding was done when inconsistencies and errors were identified.

Objective #1:*To describe the characteristics such as location, size and type of outdoor advertisements for SSBs and fast food in Soweto in a five-kilometer radius surrounding Chris Hani Baragwanath Hospital in July and August 2013.*

The categorical variable "location of the advert", for example at a primary school or secondary school, at a shop, on the street, etc., is presented as a frequency and proportion. The results are presented separately for SSBs and fast foods.

Objective #2: *To describe and compare the content of the outdoor advertisements for SSBs and fast food in Soweto in a five-kilometer radius surrounding Chris Hani Baragwanath Hospital in July and August 2013.*

Categorical variables included the following: product type (i.e. SSB, fast food, combination of both SSB and fast food, or alcohol, which was used as the comparison group), brand, presence of image, image type (i.e. product only, product and people, or graphic), sex of people appearing in advertisements, age categories of people appearing in advertisements, and specific messages conveyed (i.e. positive relationships, emotional health, physical health and state of being). These are presented as frequencies and proportions by SSB and fast food categories.

Inter-coder agreement was assessed to determine the reliability of the coding of the symbolic meaning of messages in the adverts and direction was given for subjective interpretations. Inter-coder agreement was also assessed for categories such as format of adverts. . A Kappa test was conducted to assess inter-coder agreement on 'format of advert' following the recoding, and the difference between expected agreement and actual agreement (23%) was not statistically significant (P-value = 0.9). Based on the inter-coder result, recoding was done to ensure greater consistency between the coders.

Given the small number of observations, a Fisher's Exact Test was used to detect the association between different characteristics of the adverts, for example between the characteristic 'location' for both the SSB and fast food adverts and the alcohol adverts. Due to the very few or, in some cases, single observations of some characteristics (for example 'brands' such as Fanta, Stoney's, Cooee or Sprite), some variables were recoded and grouped into fewer categories. To compare adverts by product brand for the Fisher's Exact test, the Coca-Cola and Red Bull categories remained consistent, however the various fast food adverts were grouped into one "fast food" category, the various adverts for SSB products that fall under the Coca-Cola corporate umbrella were grouped into the 'other Coca-Cola company SSBs' category, and all other SSBs from various beverage companies were grouped into the 'other SSBs' category.

Objective #3: *To explore which advertisements for fast foods and SSBs in a five-kilometer radius surrounding Chris Hani Baragwanath Hospital in July and August 2013 target children and adolescents.*

A qualitative content analysis of the advertisements was carried out based on the location of the adverts and the presence of children and adolescents under 18 years of age in the content of the adverts.

3.7 Ethical Considerations

Ethics approval (M131049) for the secondary study was obtained from the University of the Witwatersrand's Human Research Ethics Committee (HREC Non-Medical) (See Appendix D). The data will be kept electronically on the student researcher's password-protected computer for at least two years after completion of the study. Access to the coded dataset was limited to the researcher, the supervisor and the researchers involved in the primary study. It should be noted that the study did not include human subjects and that all the outdoor advertisements are in the public domain.

4. CHAPTER FOUR: RESULTS

The objectives of the study were to examine the geographic location of outdoor print advertisements and branding for sugar-sweetened beverages and fast foods in Soweto and to describe and compare their content. The study also aimed to consider whether this advertising and branding either directly or indirectly targeted children and adolescents.

The categorical variables examined in this study are presented using frequencies and percentages. Qualitative data was used to analyze the content of the advertisements and to support the quantitative data.

A Fisher's Exact Test was used to examine the association between sugar-sweetened beverages and fast food adverts and alcohol adverts (a comparison group), on certain variables (e.g. location).

4.1 Advertisements and Branding in Soweto

There were 237 outdoor advertisements and branding for SSBs, fast food and alcohol in the five- kilometer radius area of study. Of those, 149 advertised sugar-sweetened beverages and fast foods and 88 advertised alcohol products (the comparison group). Of the 149 SSB/fast food adverts, 144 were for SSBs, one was a combination advert containing an image of a Coca-Cola bottle alongside chips and a burger, and four were advertising fast food only.

Table 1: Advertisements and branding by product type, *n=237*

	Frequency	Percentage (%)
SSB	144	60.76
Fast Food	4	1.69
Combo SSB and Fast Food	1	0.42
Alcohol	88	37.13

Coca-Cola was the most common brand and accounted for 86.58% of all SSB and fast food advertisements and branding. Other sugar-sweetened beverages owned by the Coca-Cola company that were also advertised included Sprite, Fanta and Stoney Gingerbeer, which accounted for 2.01% of all advertising. Red bull was the second most commonly seen brand advertised, accounting for 4.70% of all adverts. Other SSB brands advertised included Pepsi, Coo-ee, Lemon Twist and Refreshhh, comprising 6.0% of all ads.

Given the small number of fast food adverts, all brands were grouped together to form a 'fast food' category. The fast food brands that were advertised included Kentucky Fried Chicken (n=1), Roman's Pizza (n=1), The Butchery's Fast Food (n=1), and Sthole Fast Food (n=1). Fast food brands comprised 2.68% of all advertisements.

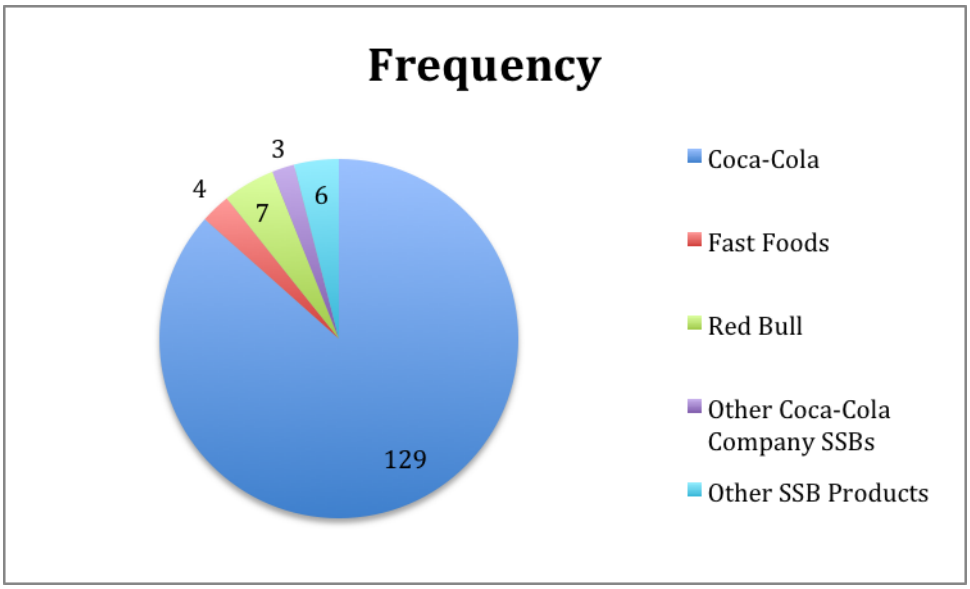

Figure 1: SSB & fast food advertisements by brand, *n=149*

4.2 Characteristics of Sugar-Sweetened Beverage and Fast Food Advertisements

4.2.1 Location

The majority of the ads (54.73%) were located at a house. In Soweto, tuck shops and shebeens are often operated out of private homes, and commonly have branded signs visible from the street advertising a product or the shop.

The second most common location for SSB and fast food advertisements was at small shopping centres (14.86%), followed closely by signs on the side of the road and/or at bus stops/taxi stands (14.19%) and then schools (10.14%). Six of the SSB and fast food adverts were located at "other buildings", for example an old age home or a clinic, and three were located at shebeens.

4.2.2 Format

Over half, (53.02%; n= 79), of the adverts were in the form of shop signs. All of these shop signs were branded with Coca-Cola only and no other brand. The second most common format of adverts/branding was posters (16.11%; n=24).

Hand painted adverts accounted for 11.41% of the sample (n=17). The painted adverts were typically reproductions of the products' standard logo or a picture of the product itself and stayed true to the respective brand. Only one of the painted adverts did not in any way represent the product's brand; it was for Coca-Cola, however it did not use Coca-Cola fonts, colours or logos, but rather was just the written word in block letters on an orange and grey background.

The fourth most common adverts were branded school signs, accounting for almost 9% of all branding and advertising, and including 13 schools in the five-kilometer radius. Of those, five were secondary schools, seven were primary schools and one was a

combined school. Coca-Cola was represented on 11 of the 13 branded school signs, while the other two brands were Pepsi and Kentucky Fried Chicken.

The remaining format of the advertisements/branding consisted of bus stop/transit shelter signs (n=6), banners (n=3), pole signs (n=3), billboards (n=2), branded umbrellas/fridges (n=1) and signs giving directions (n=1).

4.2.3 Size

The majority of the adverts and branding were medium (62.16%; n=92) and large (26.35%; n=39), while small adverts accounted for 9.46% (n=14). There were only three large billboards in the entire five-kilometer radius area under study however, and all three were located next to the only major street within that area and thus saturated that particular main stretch of road.

Table 2: Characteristics of SSB and fast food advertisements

	Frequency	Percentage (%)
Location of Ads, *n=148*		
Primary or High School	14	9.46
Creche/Kindergarten/Preschool	1	0.68
Transport Hub/Taxi Stand	1	0.68
Street/Side of Road	20	13.51
Other Building	6	4.05
House	81	54.73
Shebeen	3	2.03
Small Shopping Centre	22	14.86
Format of Ads, *n=149*		
School Sign	13	8.72
Shop Sign	79	53.02
Sign with Directions	1	0.67
Umbrella/Fridge	1	0.67
Billboard	2	1.34
Banner	3	2.01
Pole Sign	3	2.01
Painted Ad	17	11.41
Poster	24	16.11
Bus Stop	6	4.03

Size of Ads, *n=148*		
Small	14	9.46
Medium	92	62.16
Large	39	26.35
Large Billboard	3	2.03

4.2.4 Association between location of SSB and fast food advertisements and alcohol advertisements

Table 3 below shows the association between the location of alcohol advertisements and the location of the SSB and fast food advertisements. A statistically significant difference was noted between the location of the SSB and fast food adverts and the location of the alcohol adverts.

Notably, when looking at the comparison group of adverts (alcohol ads), there were none posted at schools or health facilities. Rather, they were predominantly seen where alcohol is sold, at shebeens (79.55%) and small shopping centres (14.77%). SSB and fast food adverts on the other hand were more widespread, seen largely at private homes that have tuck shops (54.36%), on the side of the road and at bus/taxi stops (14.09%), at schools (10.07%), at hospitals and other buildings (4.03%) and also at shebeens (2.01%).

Table 3: Association between location of SSB/fast food adverts and location of alcohol adverts

	Alcohol (*n=88*) n (%)	SSB & FF (*n=148*) n (%)	P-value
Primary School/Secondary School/ Creche/Kindgergarten/PreSchool	0 (0.00%)	15 (10.07%)	
Hospital/Clinic/Other Building	0 (0.00%)	6 (4.03%)	
Street/Side of the Road/Transport Hub/ Taxi Stand/Bus Stop	3 (3.41%)	21 (14.09%)	<0.01
House	2 (2.27%)	81 (54.36%)	
Shebeen	70 (79.55%)	3 (2.01%)	
Small Shopping Centre	13 (14.77%)	22 (14.77%)	

4.3 Content of Sugar-Sweetened Beverage and Fast Food Adverts in Soweto

There were 149 SSB and fast food advertisements and 123 of those contained a picture.

Coca-Cola had a picture present in 109 out of 129 of their advertisements, representing 86.58% of the total adverts with pictures. While, Red Bull represented only 4.7% of the adverts with pictures, this brand in fact had a picture present in 100% (7 out of 7) of their adverts. Three out of the four fast food adverts also contained pictures, however in each of the three (Kentucky Fried Chicken, Spur and Roman's Pizza), the picture was the corporate logo that includes a graphic of a caricature.

Table 4: SSB and fast food adverts with a picture present, *n=149*

	Frequency	Percentage (%)
Words Only	26	17.45
Picture present, with or without words	123	82.55

Table 5 below shows the association between the adverts that contained an image and those that did not contain an image, by brand. A statistically significant difference was noted. Coca-Cola advertisements were more likely to have an image, 88.62% (n=109) vs. 76.92% (n=20). Red Bull was also more likely to have a picture, which was present in every one of their advertisements.

Table 5: Picture present in SSB and fast food adverts by brand, *n=149*

Brand	Words Only n %	Picture Present n (%)	P-value
Coca-Cola	20 (76.92)	109 (88.62)	
Fast Food	1 (3.85)	3 (2.44)	
Red Bull	0 (0.00)	7 (5.69)	0.02
Other Coca-Cola Company SSBs	1 (3.85)	2 (1.63)	
Other SSBs	4 (15.38)	2 (1.63)	

The pictures in the adverts were further examined to determine the type of image contained in the picture. Three categories of images in the adverts emerged, which included a picture of the product only (e.g. a can of Red Bull,) a picture of people along with the product (e.g. people holding bottles of Coca-Cola), and a graphic and/or words only (for example, the Kentucky Fried Chicken logo which contains a graphic of Colonel Sanders and a tag line "so good"). This is shown in Table 6.

Table 6: Image type depicted in SSB and fast food adverts with an image present, *n=149*

	Frequency	Percentage (%)
Picture of Product Only	113	75.84
Picture of Product and People	7	4.7
Words/Graphics only	29	19.46

Of the 120 adverts that contained an image, 113 (75.84%) of these were images of products only and seven (4.70%) were images of people along with the product.

One Coca-Cola advert in the form of a banner contained a graphic of people. In this graphic, the people appeared only as black shadows without faces and there was no product visible in the advert, only messages in the form of words. This advert was therefore coded as words/graphics only.

4.4 Characteristics of People Depicted in SSB and Fast Food Adverts

There were only seven (4.70%) of the 149 SSB and fast food advertisements and branding that contained clear images of people. "People" was defined as images of real people; adverts with caricatures in the logo (e.g. Col. Sanders in the Kentucky Fried Chicken logo) were not coded as people. All seven of these adverts containing people were for Coca-Cola. No other product or brand depicted real people in their advertisements.

4.4.1 Age and Sex

Of the seven adverts containing images of people, the age of the people represented was evident, with only one having a child under the age of 18. This advert was for Coca-Cola and depicted a young boy standing beside a set dinner table with glasses filled with Coca-Cola at each place setting. The other six adverts all contained pictures of youth, who appeared to be in their twenties, and were thus coded as youth between the ages of 19-35.

Five of the seven adverts containing pictures of people portrayed both males and females, while two portrayed pictures of males only. None contained pictures of females only. However, three of the five adverts containing pictures of both sexes were the same advert of a woman, centered, holding a bottle of coke, with two young men out of focus in the background looking on. The other two adverts portraying both sexes were billboards. In the two adverts portraying males, one was a poster of a young boy around a dinner table and the other was a poster of a young man drinking a bottle of coke.

Table 7: Age and sex of people appearing in SSB and fast food adverts where there was a picture present depicting people, *n=7*

	Frequency	Percentage (%)
Age		
Children <18 years	1	14.29
Youth 19-35 Years	6	85.71
Sex		
Males	2	28.57
Males & Females	5	71.43

4.4.2 Race of People Appearing in SSB & fast food Adverts

In all seven of the advertisements containing pictures of people, all of the individuals appearing in the adverts were of black African race only. This represents the demographics of Soweto, which is predominantly black African.

4.5 Messages portrayed in the SSB and Fast Food Advertisements

Whether or not an advertisement contained a message was determined by assessing if the advert conveyed an idea or theme through the content or information, that is the words or pictures, contained in the advert (BusinessDictionary.com, 2014a, BusinessDictionary.com, 2014b).

Approximately three-quarters (76.51%) of the adverts in the five-kilometer radius were branding of the product only. However the remaining 23.49% of the adverts contained words and/or pictures that conveyed a message to the receiver.

Table 8: SSB and fast food advertisements containing a message, *n=149*

	Frequency	Percentage (%)
No message present	114	76.51
Message present	35	23.49

The advertisements containing a message were further scrutinized to determine the general theme of the message. These themes were grouped into four main categories according to whether the message conveyed positive relationships, a positive state of being, good emotional health and/or good physical health.

4.5.1 Messages about Positive Relationships

Of the 35 adverts containing a message, eight (22.86%) of these messages reflected positive relationships. Of those, seven (87.50%) depicted friendships while one (12.50%) depicted positive family relationships.

Seven of the adverts depicting positive relationships were for Coca-Cola and one was for Pepsi. Two of the Coca-Cola adverts were billboards portraying multiple young people, appearing like friends, with the tagline "open happiness", one was a banner with a graphic of young people in shadows who appear to be dancing at a party or club, three were posters of the previously mentioned young woman with two male peers in the background, and the final poster was of a family around a dinner table with the tagline "Coke and meals go better together". The Pepsi advert had a tagline that read "A new generation. Say no to drugs", which represented a positive peer relationship free of peer pressure to use drugs.

Table 9: Adverts depicting a message about positive relationships, of all adverts that had a message, *n=35*

	Frequency	Percentage
Had a message but not about positive relationships	27	77.14
Had a message about positive relationships	8	22.86

Table 10: Adverts depicting friendships and families, of all adverts that had a message about positive relationships, *n=8*

	Frequency	Percentage (%)
Family	1	12.5
Friends	7	87.5

4.5.2 Messages about State of Being

Of the 35 adverts that conveyed a message, there were 22 adverts depicting messages about state of being. State of being was allocated three categories, wherein the message in the adverts conveyed either fun, success or social status.

Table 11: Adverts containing a message about one's state of being, of all adverts that had a message, *n=35*

	Frequency	Percentage (%)
Had a message but not about state of being	13	37.14
Had a message about state of being	22	62.86

The advertisements that conveyed messages of fun (n=13) were of three varieties. The first was a series of billboard and banner advertisements for Coca-Cola that portrayed images of people laughing, dancing and appearing to be having fun (n=3). The second was a set of poster adverts also for Coca-Cola that contained a graphic of footballs, vuvuzelas and shooting stars (n=3). These are items that imply fun and were designed in such a way that made the advert look very dynamic. The last was a series of Red Bull advertisements (n=7) with the tagline "Wings for every taste. The effect of Red Bull." This "effect" implies a fun outcome.

The advertisements that were coded as conveying messages related to social status (n=7) predominantly contained words directly suggesting that purchase of the product would result in more value for your money. For example, messages in these adverts included "buy one get one free", "get an extra 110ml", and "redeem your Coca-Cola contour glass [with purchase]". One advert that was a large poster for Coca-Cola was also coded as social status on account of the perceived social status of the people in the advert, which was implied by the clothes they were wearing and the food on the table (pap, chicken, Coke). This reflected the prominent cultural diet of those living in Soweto.

Only two advertisements implied messages of success. One was a large size plastic Coke bottle that had messages written on it such as "you've given a truckload" and "you're a massive help". This reflected either individual success regarding ability to contribute to a positive outcome or overall success in terms of total gain achieved by this particular campaign. The second was a Pepsi advert on a school sign that contained the tagline "A new generation. Say no to drugs." A drug-free life implies one that is healthier, with more potential for personal, educational and professional success.

Table 12: Adverts depicting fun, success or social status, of all adverts that had a message about one's state of being, *n=22*

	Frequency	Percentage (%)
Fun	13	59.09
Success	2	9.09
Social Status	7	31.82

4.5.3 Messages about Emotional Health

Of the 35 adverts that contained a message, all 35 (100%) of them conveyed a message that reflected emotional health. The emotional health messages were coded as either happiness or fulfillment. The majority (57.14%) of the emotional health messages in the adverts depicted happiness while the remaining 42.86% depicted fulfillment.

Table 13: Adverts containing a message about happiness or fulfillment, of all adverts that had a message about emotional health, *n=35*

	Frequency	Percentage (%)
Happiness	20	57.14
Fulfillment	15	42.86

The 20 adverts that conveyed messages of happiness were for Coca-Cola (n=13) and Red Bull (n=7) only. The various Coca-Cola campaigns that depicted these messages included billboards with the tagline "open happiness", posters with images of people smiling and appearing very happy in their expressions, and posters with a tagline "enjoy". The

campaign for Red Bull was the same in each advert, with the tagline “Wings for every taste…the effect of Red Bull”.

The brands that conveyed messages of fulfillment were more varied and included Coca-Cola, Pepsi, Spur, Coo-ee, Roman’s Pizza, Sprite, Fanta and Stoney Gingerbeer. Examples of messages coded as fulfillment include Spur’s “a taste for life”, Coo-ee’s “seriously thirst quenching” and “Always” Coca-Cola.

4.5.4 Messages about Physical Health

Eight of the 35 adverts that conveyed messages had messages about physical health. These were categorized according to implied physical activity or physical fitness in the advert. Any advertisement that portrayed bodily movement being performed by the people present in the advert, or that contained visuals of equipment or items that represent movement or sport, were regarded as portraying messages of physical activity. Physical fitness on the other hand was defined by the appearance of people in the advertisement who had clear physiques of physically active and healthy individuals that is typically achieved by maintaining good nutrition and exercise.

The advertisements that conveyed messages of physical activity were all for Coca-Cola. One was a billboard with an image of a young man running beside a minibus taxi, giving a high five to one of its young female passengers leaning out of the window. The other three were the same advert, also for Coca-Cola, that contained a graphic of footballs and vuvuzelas, which imply physical activity and sport.

One of the adverts that was coded as fitness was the “Say no to drugs” Pepsi advert. This tagline suggests choosing a lifestyle that is healthier, fitter and drug-free. The other was for Coca-Cola and portrayed a woman who, in physical appearance, appeared to be physically fit. This advert appeared in three separate locations.

Table 14: Adverts containing a message about physical health, of all adverts that had a message, *n=35*

	Frequency	Percentage (%)
No Physical Health Message	27	80
Physical Health Message Present	8	20

Table 15: Adverts containing a message about being active or fit, of all adverts that had a message about physical health, *n=8*

	Frequency	Percentage (%)
Active	4	42.86
Fit	4	57.14

Upon exploring the association between brands and advertisements that contained a message, a statistically significant difference was noted. Branding and advertisements without a message were more common for Coca-Cola than were advertisements with a message present, 92.11% (n=105) vs. 68.57% (n=24). The same held true for other Coca-Cola company SSBs, 2.63% (n=3) vs. 0.00% (n=0), however advertisements were more likely to contain a message for Red Bull (20.00% vs. 0.00%), other SSBs (5.71% vs. 3.51%) and fast food (5.71% vs. 1.75%).

Table 16: Message present in SSB and Fast Food adverts by brand, *n=149*

Brand	No Message Present n (%)	Message Present n (%)	P-value
Coca-Cola	105 (92.11)	24 (68.57)	
Fast Food	2 (1.75)	2 (5.71)	
Red Bull	0 (0.00)	7 (20.00)	<0.01
Other Coca-Cola Company SSBs	3 (2.63)	0 (0.00)	
Other SSBs	4 (3.51)	2 (5.71)	

5. CHAPTER FIVE: DISCUSSION

5.1 Extent and Content of SSB Advertising in Soweto

The main findings of this study indicate a significant presence of advertising and branding for sugar-sweetened beverages in Soweto. There is substantially more advertising for SSBs than fast foods or, the selected comparison group, alcohol. Unlike alcohol advertising, which is restricted to the locations in which alcohol is sold, advertising for SSBs is pervasive throughout the community, seen everywhere from shops and schools to transit stops and on street sides. Most SSB advertising and branding signage is medium or large in size, and all are visible from the street to any passersby. It is not necessary to enter a venue where SSBs are being sold, to be exposed to the advertising of the products. While the main goal of the adverts appears to be product and brand recognition, there is a trend across the SSB advertisements that convey messages of happiness, positivity, fun, physical health and well being associated with the products. This messaging suggests that anyone who consumes the SSB product would in turn feel good, look good and be happier as well. A small percentage also promoted special deals to encourage product purchase.

Of all SSB brands available in South Africa, the results of this research demonstrated Coca-Cola's domination of the advertising and branding environment in the area under study. However, all SSBs must be treated equally, raising the issue of 'brand' (i.e. Coca-Cola or Red Bull) versus 'category' (i.e. carbonated soft drinks or energy drinks). The issue of brands and categories is relevant as SSB advertising on the whole can make a greater contribution to poor health outcomes if it simply encourages increased category consumption rather than just brand switching (Hawkes, 2007). This research demonstrated that, in the area under study, Coke as an SSB saturates the advertising market. However this does not prevent further growth for any brand in terms of

increasing SSB consumption. For example, advertisements may encourage a consumer to increase their consumption of Fanta, Stoney or Cooee in addition to Coke.

Images of people were only present in a small number of the adverts. However when people were present, they were all black South Africans. While this does reflect the population of people living in Soweto, it also begs the question of whether this race group is being intentionally targeted by SSB advertising and branding.

The people in the adverts were also consistently young people under the age of 35. These advertisements target young people as they represent an age group of people with growing purchasing power and brand loyalty potential. The older individuals in this age category (18-35 years) have typically entered the workforce in some capacity, either part-time or full-time in the formal or informal sectors, and now make their own decisions regarding financial spend, while the younger individuals in this category (under 18 years) often yield household purchasing power through their requests to parents which are influenced by their exposure to advertising (Hawkes, 2007, Hastings et al., 2006). Children and adolescents also often desire to imitate their older counterparts and would thus be influenced by the same adverts that appear to target 18-35 year olds in an effort to be more like them.

5.2 Media Influence on the Product Preference and Consumption of Children and Youth

Theories on socialization consistently argue that interpersonal agents (namely peers, family) and media play the most influential role in adolescent health literacy (Paek et al., 2011). Direct modeling by both parents and peers of health beliefs and behaviours, whether health promoting or disease promoting, has been identified as the most significant influence on a young person's own health behaviours (Lau et al., 1990). This influence only strengthens over time while the child is at home living with parents and

persists through the college years when surrounded by peers. Thus the SSB advertisements that portray young people modeling the behaviour of drinking SSBs and appearing happy, healthy and active, are particularly effective in promoting SSB consumption by successfully combining both media influence and direct modeling influence.

Little is known about fast food and SSB purchasing and consumption patterns in South Africa, however one notable study that examined factors affecting young adults' purchase and consumption of fast foods found that television was the most effective medium at influencing choice (Van Zyl et al., 2010). A similar study based on a national survey found that owning a television increased a person's odds of purchasing street foods or fast foods up to four times (Steyn et al., 2011). This may have been a result of increased exposure to fast food advertisements as a result of owning a television. 21% of participants consumed fast food at least once per week and 27.6% consumed fast food two to three times per week, and soft drinks were the most popular beverage consumed (Van Zyl et al., 2010). There were ethnic variations in this consumption however, with black South Africans being more likely to use street foods everyday or nearly everyday, while whites and Indians hardly used street foods (Steyn et al., 2011).

A significant amount of research related to the impact of advertising and marketing has focused on its ability to strongly encourage brand loyalty, thereby influencing brand preference and consumption for the remainder of an individual's lifetime. SSB companies' in particular, frequently sponsor youth-oriented activities, events and organizations, which involve direct marketing of the products and brand to young people and ultimately encourage brand recognition and brand loyalty over time (Dorfman et al., 2012).

The impacts of these combined efforts by SSB companies are exaggerated in developing countries like South Africa. Children in developing countries may be more readily influenced by advertising than their counterparts in developed countries as they often possess less understanding of marketing strategies (Hawkes, 2007).

It is important to note then that, while the SSB and junk food advertisements in Soweto rarely directly targeted children and youth by including images of them in the advertisements, they did target children and youth via a deliberate placement of the advertisements and branding on school signs where children come in contact with the adverts daily. Ten percent of all advertisements and branding in the study area were at schools (crèche/preschool/kindergarten/primary/secondary), which included 15 schools in a 38-square kilometer radius. Additionally, it must be reinforced that all of the advertisements and branding in this study were visible from the street. Given that children in Soweto walk to school, this means that they are also passing by these SSB advertisements on their way to and from school every single day. Thus this repeated exposure to SSB advertising among school-goers risks both an increase in brand recognition and an influence on preference and consumption.

Previous studies have provided recommendations for addressing SSB and fast food advertising to children that are often overly complicated and place extensive responsibility on the individual. For example, after examining brain responses to food logos, Bruce et al (2013) recommended that children be assisted in improving cognitive and self-control, such as learning to delay gratification, in order to improve their capacity for health-related decision-making. This is a very complex solution. More straightforward alternatives include creating supportive environments that make health an easier state to achieve than sickness, by implementing reductions or bans on the production, sale and advertisement of fast foods and SSBs that are knowingly harmful to human health. Likewise, governments could subsidize vegetables and fruits rather than tax SSBs and fast foods. A fundamental solution would emphasize teaching young

people the fundamentals of nutrition and supporting the availability of whole food diets rich in vegetables, fruits, legumes, nuts, seeds and whole, unrefined grains. This would address the argument by Hastings et al (Hastings et al., 2006) that recommended diets receive little to no promotion, while nutritionally-poor foods receive extensive promotion.

5.3 Regulating SSB Advertising Targeting Children and Youth

Ten per cent of the advertisements were located on school premises, with branding comprising a large portion of school signs at both primary and secondary schools. This exposes children and adolescents to SSB branding on a daily basis and from an early age. This, together with the content of the advertisements that included images of young people, are strongly indicative that children and adolescents in Soweto are being directly targeted by SSB advertising and branding.

The United Nations Convention on the Rights of the Child (CRC) urges children's right to information that is pertinent to their health and well-being, government's responsibility to restrict the promotion of information and materials that are harmful to children and media's responsibility to ensure messaging that children understand (United Nations General Assembly, 1990). Given the position of the CRC, governments and the food and beverage industries hold equal responsibility in meeting these recommendations; any abdication of one does not excuse the other. Both the South African government and SSB companies operating in South Africa, have an ethical accountability to these provisions and restrictions on the advertisement of SSBs that are known to be harmful to human health.

One method of meeting this ethical obligation is through CSR. Companies often resort to CSR as a method of self-regulation when pressure mounts from governments and civil society (Dorfman et al., 2012). This was true decades ago in the case of tobacco and

currently holds true when it comes to junk food and SSBs. Most developing countries, including South Africa, however have little advocacy regarding SSBs and junk food and thus industry self-regulation regarding SSBs is limited (Hawkes, 2007). Some of the reasons developing countries lag in advocacy efforts include a lack of awareness of the issue, government tendency to leave regulation to the market, and the slow process of lawmaking (Hawkes, 2007). It is also a result of the lobbying efforts of the more powerful junk food and SSB industries themselves to prevent or minimize regulations (Hawkes, 2007).

When the SSB and junk food industries do put forth effort with self-regulation in the form of CSR, the emphasis tends to be placed on the individual's own responsibility for their health. This approach suggests that obesity is a result of the consumers' own bad behaviour and lifestyle choices and diverts attention away from the industry's contribution to the epidemic by putting the onus on the individual (Dorfman et al., 2012). Such strategies typically involve suggesting moderation when it comes to consumption of SSBs and, most notably, initiatives to promote increasing physical activity and reductions in sedentary behaviours in order to offset high caloric energy intake, primarily in the form of sugars.

The negative health impacts of sugar, and SSBs in particular, extend well beyond just high caloric intake and resulting obesity however. Risks of high sugar intake include insulin resistance and diabetes, cardiovascular disease, metabolic syndrome and nonalcoholic fatty liver disease (Bray, 2013). With a five-fold increase in the consumption of soft drinks in the last 50 years (Bray, 2013), it is not surprising that the prominent response over the last decade of promoting increased physical activity as the solution to obesity is not effectively resolving this epidemic.

Governments and public health professionals can apply lessons learned in tobacco control to greater restrictions on advertising of sugar-sweetened beverages, especially

to targeting children. When the tobacco industry failed to self-regulate, governments around the world eventually began to enforce tobacco control laws to protect population health (Dorfman et al., 2012). The same action must now be applied to the issue of sugar-sweetened beverages.

5.4 Study Limitations

The field workers and research assistants followed an established protocol in the process of data collection, however it is possible that some advertisements and branding in the five-kilometer radius area under study could have been missed by the field workers and thus not included in the total number of adverts and subsequent content analysis.

Other qualifying/eligible advertisements and branding may not have been included in the study due to the non-compliance of a couple of alcohol vendors and shop owners to permit the collection of data (i.e. photographs being obtained). This could potentially limit the accuracy of the total number and content of alcohol adverts (the comparison group), however to prevent this gap the fieldworkers noted the presence of an advert and its location even though the content of the ad could not be captured in an image.

Finally, even within the short eight-day period, a very small number of the advertisements were changed over the course of data collection, reflecting an ever-changing advertising space. In these rare instances, only the original advert that was captured first was included in the study in order to prevent inaccurate reporting of the total number of adverts.

6. CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

SSB and junk food advertising has been a topic of interest for at least the past decade with the rising obesity epidemic worldwide. What this research contributes to the topic is the understanding that SSB advertising to the population in Soweto, which is typically black South African and lower LSM in the particular area under study, is extensive and far surpasses advertising for junk food or alcohol. This is of concern for its potential impact on SSB consumption and subsequently on the chronic disease epidemic in South Africa. Another valuable contribution of this research is its examination of the extent and nature of outdoor *print* advertising rather than television/broadcast advertising, which is the focus of most research on junk food and children's advertising (Hastings et al., 2006). Print advertising is more likely to have a broader reach than television advertising, (Veerman et al., 2009), particularly in developing countries.

Legislation has been at the crux of discussions related to reducing the population health impacts of SSBs and fast foods and the advertising that promotes it. The South African government has, in the past, enforced legislation where corporate self-regulation is lacking or insufficient. Most recently, this was exemplified in the government's progressive and widely-praised steps to regulate the salt content of processed foods (Hofman and Tollman, 2013). Considering the current burden of chronic disease in South Africa, which shows no signs of tapering or reversing, the government must once again be proactive and preventative in regards to the role of SSBs in declining public health. It took decades for appropriate action against the negative public health effects of tobacco. According to the WHO, populations and health systems around the world, notwithstanding South Africa's overburdened health system, can no longer afford similar delays in the response to SSBs. Legislation for advertising and branding of SSBs is a logical and effective place to begin.

6.1 South Africa's Food-Based Dietary Guidelines

South Africa's current food-based dietary guidelines recommend that South Africans "use sugar and food and drinks high in sugar sparingly" (The Nutrition Society of South Africa, 2012). The 2003 guideline included a recommendation to avoid food and drinks containing sugar "between meals" however this was removed when the FBDGs were updated in 2012. These guidelines are extremely vague, as "sparingly" is subject to interpretation, which would be influenced by an individual's nutrition knowledge and health literacy. These guidelines should be revised, specifying the daily recommended limit on sugar and clarifying which sugars (i.e. fructose, sucrose, etc.) are preferable and which to avoid. These guidelines should be widely distributed to all South Africans.

6.2 Policy

South Africa must consider policy development to address the targeting of SSB and junk food advertisements to children and adolescents. One particular study on the role of socialization agents in the development of health literacy, showed that health information from media has an equally powerful influence on shaping one's health literacy as does health information from peers (Paek et al., 2011). For this reason, many countries around the world have been debating legislation on advertising junk food and SSBs to children for over a decade (Hawkes, 2007). Many countries, such as the United Kingdom and Brazil, have already moved forward with advertising restrictions, however these restrictions are often watered-down versions of initial proposals on complete bans, due to the successful lobbying efforts of the SSB and junk food industry (Hawkes, 2007).

South Africa should now follow the lead of these country examples and extend its efforts to use legislation and fiscal levers to address non-communicable diseases. In March 2013, South Africa demonstrated global health leadership in its legislation to make salt reduction in packaged foods mandatory. The government has mandated the food industry to start reductions in 2016, with further enforcements coming by 2018 (World Action on Salt & Health (WASH), 2013). South Africa also committed to the Framework Convention on Tobacco Control which obligates the country to set restrictions on tobacco, pertaining to advertising, labeling, smoking in public places and point of sale products (Matsau, 2012).

The government should continue this momentum and remain steadfast in its adoption of measures to protect population health over corporate interest, by implementing legislation pertaining to SSB advertising. Such restrictions may include: a ban on any SSB advertising or marketing anywhere on school property; a restriction on sponsorship of youth activities, events and organizations wherein sponsorship can be made but marketing of products in relation to that sponsorship is prohibited; a ban on the sale of SSBs in schools or at school-related events; restrictions on point of sale marketing; restrictions on the number of adverts/branding permitted in a square-kilometer radius; mandatory health warnings on SSB products that outline the recommended daily limit of sugar intake and the health consequences of sugar consumption.

While adding a tax on junk food and SSBs has been a widely considered strategy in developed countries (Pomeranz, 2012), it is not recommended in a South African context. A sales tax has not yet been widely implemented to establish proven effectiveness. A sales tax would unnecessarily cause an additional financial burden to low- and middle-income earners as they are more likely to consume greater amounts of these cheaper, nutritionally poor foods. Moreover, this strategy puts the onus on the individual instead of placing responsibility on the SSB and junk food industry. An excise tax on the other hand is imposed on the SSB and/or syrup manufacturer however is still

likely to affect the consumer through an increase in the base price of SSB products. (Pomeranz, 2012). If an excise tax is applied to the manufacturing of SSBs then this revenue could effectively be reinvested into education and awareness initiatives as it has in Thailand (Thai Health Promotion Foundation, 2014).

The goals of SSB legislation in South Africa could resemble those of tobacco legislation (Matsau, 2012), and may include helping existing consumers of SSBs to reduce their consumption, to limit and possibly delay consumption of SSBs among children and youth by limiting their exposure to advertising, and to increase health literacy by ensuring appropriate nutritional and health messaging wherever advertising and sale of SSBs and junk food is deemed appropriate.

6.3 Education/Awareness

Health literacy is an individual's ability to obtain and understand basic information related to health and health services, and to apply it to make health promoting decisions in both everyday and novel situations (Paek et al., 2011). Despite improvements in education levels overall in South Africa, there still exists a less than optimal level of health knowledge in the country (Mchiza and Maunder, 2013).

It is not uncommon for populations to perceive their diets and lifestyles as being adequately healthy, including a perception that they consume higher fruit and vegetable intake and lower saturated fats than they actually do. This has been demonstrated in research in Europe, Australia and America (European Food Information Council, 2005). This bias can lead individuals and populations to underestimate their risk for chronic diseases and perceive little need to make changes to their dietary habits. This was reflected in the SANHANES-1 study, wherein 63.8% of participants believed that their diet was healthy and did not require any dietary changes (Shisana et al., 2013), despite

the prevalence of obesity among participants and a national dietary diversity score close to the cut off level for dietary adequacy at 4.2 (Shisana et al., 2013).

The SANHANES-1 study also revealed that health literacy among South African children is poor, particularly with respect to nutrition. The average general nutrition knowledge score was 1.8 out of a possible 6 points, with 71.7% receiving a low score and only 0.9% receiving a high score (Shisana et al., 2013). Measures must be taken to help improve knowledge of nutrition, healthy weights and NCD among South African children and adolescents.

In any context where SSB advertising or branding is deemed appropriate, it must contain appropriate health information as well as health warnings and must not contain misleading messages associating SSBs with wellbeing and health, as noted in the results of this study. On the other hand, counter advertisements and social marketing campaigns can help to convey appropriate health information and educate audiences on the health implications of sugar and SSBs. This can empower people to make more informed choices.

Adults and parents are viewing the same print advertising as are children and youth. The study by Paek et al. (2011) found that the more often participants reported hearing health information from either the media, their parents or friends, the higher they ranked their own level of health literacy. As the strongest agents of socialization for health information (Paek et al., 2011), it is essential that media, parents and peers are educated about SSBs and are all communicating accurate information.

6.4 Work with Schools

This study demonstrated children's exposure to harmful SSB advertising and branding right in the school environment. Yet healthy schools initiatives, which are increasing around the world following the WHO's Global School Health Initiative (WHO, 2014a), acknowledge the school environment as the ideal avenue for shaping health literacy and healthy lifestyles among children and adolescents.

Even in countries without established national policies related to junk food and SSB advertising to children and youth, Ministries of Education and individual schools often make independent decisions to ban either or both of the advertisement and sale of junk food and SSBs in the school environment. An example from Canada is the province of Ontario's ban against the sale of junk food in vending machines, the elimination of the sale of any foods containing trans fats in school cafeterias, and the establishment of nutrition standards for all food and beverages sold in schools or at school-related events (Ontario Ministry of Education, 2014).

The effective implementation of South Africa's own Integrated School Health Policy (DoH and DoBE, 2012), can improve media literacy and health literacy, as they relate to nutrition, through the national curriculum. This may include education related to dietary diversity, the role of nutrition in chronic disease, the nutritional content of healthy foods such as fruits and vegetables compared to SSBs and junk food, practical information around selecting and preparing healthy foods. In the absence of legislation, each of pre-, primary and secondary schools should also be encouraged to take it upon themselves to ban the advertisement, branding, marketing/communications and sale of SSBs on school property or at school events held off-premises.

6.5 Further Research

Given the lower priority of both chronic diseases and the advertising and sale of junk food and SSBs in South Africa, immediate attention is needed on these issues in order to prevent another looming health crisis in a country already struggling to meet its populations' health needs.

Preliminary research in South Africa should raise red flags, considering that television advertising has been shown to contribute to childhood obesity by up to 40% in the United States, 28% in Australia and 18% in Britain (Goris et al., 2010). The question remains whether these findings for television advertising hold true for exposure to outdoor advertisements and branding. Additional research is required to determine the association between the high rate of exposure to print advertising in Soweto and the level of consumption of SSBs among the population of both children and youth and adults in Soweto.

It may also be beneficial to examine South African children and adolescents' understanding of the advertising environment and how this affects their health literacy.

Further research may explore the extent of SSB and junk food advertising (in all forms of media including print, television, radio and social media) in higher resource neighbourhoods in Johannesburg (e.g. Sandton) and to then draw comparisons to the extent of advertising in Soweto, as demonstrated in this study. Would research reveal the same extent of advertising in Sandton, for example, as in Soweto? Research to explore comparisons in resulting levels of consumption could also be conducted. This would provide an indication of whether SSB companies are clearly targeting lower LSM (Living Standards Measurement) individuals and communities with their products and may further inform SSB advertising policy development.

Finally, as previous research has recommended, in the absence of such research in a South African context, the government should urgently adopt WHO's new guidelines on sugar and move forward to set clear and restrictive guidance on daily upper limits of sugar intake (Mann, 2012), and SSB intake specifically.

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Appendix A: Data Collection Coding Sheet and Codebook

Data Collection Coding Sheet Template from Primary Study

Unique ID	GPS_Longitude	GPS_Latitude	Type Of Advert	Size	Location	Description
101	S26	E027				
102	S26	E027				
103	S26	E027				
104	S26	E027				
105	S26	E027				

Data Collection Codebook from Primary Study

Codebook for Data Collection	
Type of Advert	1=School sign
	2=Shop (name) sign
	3=Sign giving directions e.g. KFC turn back 250m
	4=Other sign e.g. old age home
	5=Umbrella/fridge
	6=Billboard
	7=Banner
	8=Pole sign
	9=Painted ad
	10=Other
Size	1=Small
	2=Medium
	3=Large
	4=Large billboard
Location	1=Primary or high school
	2=Creche/kindergarten/preschool
	3=Hospital/clinic
	4=Transport hub/taxi stand/bus stop
	5=Church/temple/mosque
	6=Street/side of road
	7=Other building
	8=)ther
Excluded:	Hats, t-shirts, packaging, taxis, buses, actual fast food store, sign saying "fast food" but not specifying
Included:	Permanent ads, fridges on wheels, umbrellas, all branded signs, billboards on the ground of fast food store

Appendix B: Codebook and Coding Sheet for Photographs

Codebook for Photographs

Codebook for Coding the Advertisements	
Picture Present	0 = No
	1 = Yes
Image Type	1 = Product Only
	2 = People and Product
	3 = Graphic
Branding Present	1 = Yes
	2 = No
Product Type	1 = Sugar-Sweetened Beverage
	2 = Fast Food
	3 = Combo SSB and FF
	4 = Alcohol
Brand	1 = Coca-Cola
	2 = Tropica
	3 = Dros
	4 = KFC
	5 = McDonald's
	6 = Nando's
	7 = Chicken Licken
	8 = King Pie
	9 = Spur
	10 = Red Bull
	11 = Sprite
	12 = Fanta
	13 = Pepsi
	14 = Generic
	15 = Coo-ee
	16 = Roman's Pizza
	17 = Fanta
	18 = Stoney
	19 = Refreshhh
	20 = Lemon Twist
Brand Re-Coded	1 = Coca-Cola
	4 = Fast Food
	10 = Red Bull
	11 = Other Coca-Cola Co. SSBs
	13 = Other SSBs

Codebook for Coding the Advertisements, Cont'd	
Target Audience Age	1 = Children 18 years & younger
	2 = Adolescents 19-35 years
	3 = Adults 36 years & above
	0 = Not Specified
Target Audience Sex	1 = Male
	2 = Female
	3 = Both
	0 = Not Specified
Target Audience SES	1 = LSM 1-4
	2 = LSM 5-7
	3 = LSM 8 - 10
Message Present	0 = No
	1 = Yes
Message	1 = Positive Relationships
	2 = Improved State of Being
	3 = Emotional Health
	4 = Physical Health
Msg_PosRel	0 = No
	1 = Yes
Msg_StateOfBeing	0 = No
	1 = Yes
Msg_EmotionalHealth	0 = No
	1 = Yes
Msg_PhysicalHealth	0 = No
	1 = Yes
Race	0 = Not Specified
	1 = Black
	2 = Other
Positive Relationships	1 = Family
	2 = Friends
State of Being	1 = Fun
	2 = Success
	3 = Social Status
Emotional Health	1 = Happiness, Joy
	2 = Fulfillment
Physical Health	1 = Active
	2 = Fit

Sample Coding Sheet for Photographs

Unique ID	Type of Ad	Format of_Ad	Size	Location	Description	Branding Pres	Brand	Image Pres	Image Type	Target Age	Target Sex	Msg Pres	Msgs Pos_Rel	Msgs State_Being	Msgs Emot.	Msgs_ Phys.	Pos. Rel	State Being	Emot.	Phys.	Race
101	3	3	1	6	Spur Silver Falcon Maponya Mall	1	9	1	3	0	0	1	0	0	1	0	0	0	2	0	0
102	1	1	2	1	Coca-Cola Tuckshop	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
103	1	1	2	1	Thaba Jabula Secondary School Coca-cola	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
104	1	2	2	9	Coca-Cola Valencia Tuckshop	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX C: ETHICS APPROVAL

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M131049

NAME: (Principal Investigator)	Ms Shannon Boyd
DEPARTMENT:	School of Public Health Medical School
PROJECT TITLE:	The Extent and Content of Outdoor Advertisements for Sugar-Sweetened Beverages and Fast Foods in Soweto
DATE CONSIDERED:	25/10/2013
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr N Christofides
APPROVED BY:	Professor PE Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 25/10/2013

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

S Boyd — Principal Investigator Signature

01/12/2013 — M131049Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES